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XI.

CONTRIBUTIONS TO THE PHYSICAL GEOGRAPHY OF THE MISSISSIPPI RIVER, AND ITS DELTA.

By Rev. Edward Fontaine.

READ DECEMBER 26TH, 1871.

This essay describes the peculiarities of the scenery of the river and its bottom, where De Soto first saw it, from Memphis to Vicksburg. The sawyers, islands and tow-heads. Its crumbling banks and the shifting of its channel. Causes explained. Peculiarities of the scenery and climate of the lower coast. Temperature of the river and gulf, and its cause, and effect upon the vegetation of this part of the delta. The northers, typhoons and whirlwinds described, and an explanation of their cause. The insects and reptiles of the delta. Separate lectures are devoted to "the mud lumps," "salt islands" and "the cause of the velocity of the current of the Mississippi," and verbal extracts from them, explain these subjects which are embraced in the physical geography of the river.

The Mississippi River.

Contributions to its Physical Geography.

The first time I ever saw the Mississippi river was in the month of December, 1838. The Chickasaw Indians, who had for several centuries occupied the northern part of Mississippi, had sold their lands, embracing about a third of the whole area of that State, to the United States in 1833, and had all migrated to the territory ceded to them west of the great river. The country of De Soto had been organized, and the new town of Hernando built, and emigrants from all the other States were pouring into the country, and commencing their improvements upon the sites of the wigwams and the fertile hunting grounds of the 6,000 Indians who had relinquished their valuable heritage forever to our race. The celebrated John Wesley, the founder of Methodism, while he was a missionary in the colony of Georgia, during the administration of Governor Oglethorpe in 1739, described the Chickasaw Indians as being then in number and character precisely as they were 100 years afterwards. He said they numbered about 6,000, and that they were the most truthful and honorable of all the savages of America who had any intercourse with the English. It was through their country that De Soto marched in his adventurous search after El Dorado of the West. They treated him with great hospitality until he provoked their hostility by his rapacity and cruelty. They then fought him gallantly, and he vainly attempted to subdue them. They marked every step of his advance, from the Tombigbee river to the Mississippi, with blood. They destroyed the most of his horses and many of his soldiers, and he only escaped from their fury by crossing the Mississippi, which was the western boundary of their territory, and by continuing his march with his shattered forces in the dismal and malarious swamps on the opposite shore. As late as 1836, about 292 years after their war with the Spaniards, these Indians had preserved a distinct tradition of De Soto and his barbarities, and spoke of the invaders with detestation and horror. They loved the English, who had an agency among them in 1760, and it was their boast that they had never shed the blood of a white man. They regarded the swarthy Spaniards, mailed in iron and mounted upon horses, animals which they had never seen, and armed with muskets and artillery, as supernatural and destructive demons; or men of a different race from themselves or the white colonists of England. They took no part in the war of the revolution or in that of 1812. The United States paid them $3,000,000 for their lands, and reserved to each Indian a section of land, leaving it optional with them to remain upon their reservations under the laws of Mississippi, or to go to the lands assigned them in their Trans-Mississippi territory. They preferred selling their individual property and migrating. The treaty and its honest observance was highly honorable alike to our government and to the Indians. They were about 6,000 in number, and the treaty made each Indian worth about $5,000 in gold; and they were the wealthiest nation in proportion to their numbers in the world; 2,000 of them had made a profession of Christianity. Many were civilized planters and stock raisers, and some of them owned large numbers of negro slaves and herds of cattle. For their civilization they were mainly indebted to Gen. Washington, through one of their chiefs named Colbert, who died at a very advanced age, after the treaty and before their migration. He visited Gen. Washington in Philadelphia while he was president, and brought back with him a small *shovel plow* which he presented to him, and which was carefully preserved by him in his house until he died. It was a great pleasure to the venerable chief to relate its history to his white guest, and to repeat to them this speech which Gen. Washington made to him when he presented it: "When you go home, tell your people that if they attempt in this age to live as their fathers did, by *war* or by *hunting*, they will perish and pass away from the earth like the many tribes who have died where the white men live. But if they will quit war and hunting, and make corn with the plow, and use the tools of the white men in clearing their land, building houses and cultivating the earth, and if they will raise horses, cattle and hogs, and adopt the religion and customs of civilized and Christian nations, they will live long and prosper as a people." Colbert and all the principal men of his tribe adopted this wise advice; he died possessed of great wealth after living long as the benefactor of his race, and his nation is yet prosperous. I have said this much about this interesting tribe of aborigines, because it was through their country that De Soto marched to the Mississippi, which he reached in their territory. The precise point where he first saw it has never been certainly determined. The Chickasaw tradition, that it was at the present site of Memphis, is probably correct. Recent historical investigations, made since the white settlers of "the Chickasaw nation" named the country *De Soto*, and its county seat *Hernando*, in honor of the brave and enterprising Spaniard, made it clear that he did not discover the Mississippi in 1542 or '44, nor did La Salle anticipate other European adventurers in finding its mouth more than a century later. The narrative of the travels and voyages of Cabeza De Vacca, translated by the late Buckingham Smith, proves that this Spaniard, Alvar Nunez Cabeza De Vacca, discovered its mouth Nov. 2, 1528. In sailing from the coast of Alabama west, he passed the mouth of the Mississippi, and his narrative gives such a description of the outlet, and the peculiarities of the adjacent coasts which he saw, as will be recognized by any person who has ever seen "the passes," as they are termed, and "the mud lumps" about them. He found a great body of fresh water rushing out with a strong current into the Gulf of Mexico. He endeavored to ascend the river, whose water he drank far from the land, but a "norther" was blowing at the time, and the combined force of the wind and river current prevented him. No sailing vessel can enter either of the passes and ascend the river in the teeth of the wind and the river current. But, although Columbus did not discover America, nor La Salle nor De Soto the Mississippi, they and the hardy heroes who were their companions and cotemporaries deserve all the admiration and gratitude we can bestow upon their memories. Their skill and daring certainly gave America to Castile and Leon, to Portugal, France, England, Denmark, Holland and Russia. Their valor, fortitude and sublime enthusiasm overcame perils and obstacles formidable as the fabulous Cyclops, Lestrigons and Scyllas braved by the mythical heroes of antiquity, and they deserve the lays which have been sung and the monuments which have been reared to perpetuate their fame.

The point where I first saw the Mississippi, and which I must introduce, as it first impressed me and excited my curiosity to explore its wonders, was interesting, not only as being near the spot where De Soto crossed it, but as one occupied by the predecessors of the aborigines whose arms he encountered. That part of the valley of the Mississippi, including the area between the Cumberland mountains where they terminate near Tuscumbia and Florence, and the mouth of Big Black river, and embraces the valleys of the upper tributaries of the Tombigbee, with the country watered by Wolf river, and all the affluents of the Yazoo and Big Black, was once densely inhabited by "the mound builders" who preceded the Indians who occupied America in the time of Columbus. All the more fertile parts of the lands of the Choctaws and Chickasaws which lie within the limits of Mississippi, and formerly in a part of Alabama and Tennessee, show the former occupancy of a much more numerous and more highly civilized race, whose remains are found wherever I have examined the rich lands of the west between the Allegany and the Mississippi. The whole valley, from Cairo to the mound of Point a la Hache on the bank of the river, fifty miles below New Orleans, is full of them. They are found not only on the Ohio, and the Trinity river, in Texas, but in every situation between those points which would now be selected as a favorable spot for planting and farming by a skillful agriculturist of the present age. The Choctaws and Chickasaws did not claim the builders of these tumuli as their ancestors, and knew nothing about their history. But the Egypt of this extinct race was the whole of the western part of Mississippi, including the fertile terraces of the present river bottom called "the Bluffs," and the wide area of alluvium irrigated by the Yazoo and the numerous bayous which connect it with the Mississippi, and which, if they were not canals made by them, were certainly leveed and controlled, and utilized for agriculture, navigation and commerce. On examination of the levees which they constructed upon the banks of these natural or artificial canals, and the multitude, magnitude and scientific construction of the various kinds of mounds which are so numerous as to give to the *Yazoo-ok-hinnah the River of Ancient Ruins*, will convince any antiquarian that multitudes of industrious toilers, as numerous as those which swarmed upon the lower Nile, and built its canals, pyramids, temples and cities, navigated the waters and cultivated the lands of this region in past ages. When I explored it, the white emigrants had commenced making their settlements in it. The Chickasaws had migrated. The ancient canals, levees, pyramids and their former fields were all covered with the dense forest, and the neglected and unrestrained waters reflected the dismal scenery of a vast and fearful wilderness. The Indians, in the dry seasons when the waters had receded, penetrated portions of this region, where their predecessors built, labored, flourished, faded and passed away. De Soto got involved in the intricacies of these great forests and impassable bayous, and, poisoned with malaria and worn down with toil and want, he died. From the town of Hernando, named after him, going west I examined the aboriginal ruins of the Mississippi bottom, and passed through what was the most populous portion of their ancient domain, favored by a very dry season and pleasant weather, when the Mississippi was at its lowest stage of water, and I saw it for the first time thirty miles below Memphis, near the present site of the town of Commerce.

About a mile in width, between deep banks twenty or thirty feet high at that point, the immense volume of dirty, yellowish-brown water rolled along swiftly and silently. It was a grand and fearful-looking object, and my first view of it excited my admiration, mingled with a degree of terror. Not a human habitation was in sight, and no vestige of the work of man appeared to cheer me. Three large quadrangular pyramids, the work of an unknown and extinct race, were near me, and only served to deepen the gloom of the forest which shaded both shores. I could not call it a *primeval wilderness*, because these mounds, and many others which I had passed, and the well leveed bayous I had crossed, proved that all the older alluvial bottom had been cleared and cultivated ages ago by the vanished race who constructed these immense works now, covered with great trees, bushes, cane and tangled vines. Where the strong current of the river flowed against a precipitous bank of stratified sand and clay of various colors, the whole mass, for a half mile in length, was tumbling into the excavating tide, and one of these mounds with all the trees upon it had lost half of its bulk, and was falling into the muddy waves, to be transported to form the delta of Louisiana, or to build up some part of the gulf or ocean, or else to add to the new land of some distant island or continental shore. From the opposite bank a yellow sand-bar, laid bare by the shrunken winter volume of water, projected for a quarter of a mile. The wreck of a flat-boat was stranded upon it, and the whole bed of the river was studded with what are termed *sawyers*, more exposed at low water, but not more dangerous than when it is higher, and when their projecting points are covered slightly and concealed thoroughly by the turbid current. These sawyers are the most formidable pests to the navigation of the great river, when the sand and mud-bars can be passed. They are long-seasoned logs fastened to the bottom of the river, with their points turned down stream, and aimed directly at the prows of all vessels ascending the mid-channel. They are formed abundantly from August until the river sinks to its lowest point, by the caving of the banks, which are undermined by the deep and rapid bottom-current, and as the surface falls below the layers of clay from underneath which the sand has been washed out, the clay and surface soil are left without support, and the banks topple down and fall, with a sullen roar, into the river, with the trees, and often with the houses, and, in the course of a few years, with all the plantations on this part of its restless and ever-shifting course. The trees, many of them more than 100 feet long, divested of the earth adhering to their roots, float off toward the Gulf of Mexico ; but if much tenacious clay sticks to them, their roots are sunk beneath the surface, and their buoyant tops swim with the tide until the heavier butts drag upon the bottom and fasten to it ; the floating tree then stops ; its roots are deeply buried by the moving sand and all that rolls upon the river bottom. The lap of the tree, with all its out-spread branches, are swayed in the direction of the current, while its roots are firmly anchored. All the branches which extend laterally are broken off by the heavy drift-wood which is hurled against them with force, as they are borne along at a velocity which averages four miles per hour. In high water, even in the Delta, the current of the Mississippi flows at the rate of five miles an hour, and it is almost incredible that a log is borne by it in a single day 120 miles.

This drift-wood, aided by the flat-boats and steamers which glide over it, breaks off the branches and sharpens the trunk of the tree, and completes the manufacture of the dangerous *sawyer*. It is a long and elastic tree ; it is pressed down by the heavy volume of water when a strong eddy rolls over it, but its elasticity makes it spring up above the surface again ; and thus it sinks below the water level, and rises again with the regularity of a great pendulum. It is this up and down movement, like the working of an old fashioned *whip-saw*, which has given these terrible snags the name of *sawyers*. At low water they are seen everywhere between Cairo and Baton Rouge, but more abundantly below Memphis, obstructing the channel with their inclination about that of the muskets of a line of infantry prepared to receive a charge of cavalry, with the butts of their weapons planted firmly upon the ground, and their bayonets pointed toward the breasts of the advancing horses. Woe to the ascending steamer whose prow or hull meets the sawyer's point! A stunning shock suddenly arrests its course. The huge beam crushes through the bottom and decks, and rends a vast orifice which lets in the rushing waters. Its fires are extinguished, and its wheels are stopped; spitted, impaled and powerless, it sinks to the bottom. If the water is deep, and it is far from shore, and especially if it is in the winter, or in the night, not only is the boat and cargo a total loss, but few of those on board escape with their lives. The banks of the river are strewn with the wrecks made by these sawyers. How often have you read the brief newspaper items: "The steamer ——— struck a snag near the mouth of White river, and went down in deep water. Boat and cargo a total loss—passengers saved—passengers drowned." The stumps and trees standing upon the caving banks have their roots in such friable and crumbling soil, that they make very insecure supports for the fastening of the hawsers of the steamers. At high water the river is within a few feet of the tops of these precipitous banks, which are generally used as wood-yards for the convenience of steamers which can run in the deep water which flows against them, and take on the wood without difficulty. But, in doing what is called "rounding-to to wood," it is necessary to throw out a hawser and fasten it to a tree or stump. If this is near the edge of the treacherous bank, when the weight of the boat, borne down by the current, pulls against it, the bank "gives way," and down comes the tree or stump and the vessel floats off. These unstable banks, the sawyers and drift-wood give origin to some queer but very expressive western sayings. When a man proposes to form a partnership with another with whom he is not very well acquainted, and consults a friend who knows him, whether his association with him would be prudent, he is told, if he is unreliable, that "he will not do to tie to." He is like a stump that will not hold the steamer fast. The famous confederate cavalry leader, General J. E. B. Stuart, who was a very ardent and fast friend, in writing to his associates, usually subscribed his letters, "Yours to tie to." An allusion is made to the sawyer, when a rash individual encounters an antagonist whom he expects to vanquish easily, but is mistaken, and gets woefully defeated. It is said that "he ran against a snag." When an inhabitant of the Mississippi bottom wishes to assure you how a thing apparently difficult and dangerous can be performed in the easiest manner possible, he draws his illustration from the drift which covers abundantly all the lakes and bayous, as well as the surface of the great river. Upon this drift-wood myriads of water terrapins, snakes and alligators lazily bask in the sun. When suddenly alarmed they drop from it instantly and disappear in the water. The Mississippians tell you that the thing can be done "just as easily as falling from a log." These people express their detestation of the leaders and members of the corrupt rings who plunder the public money, and hold it with a miserly clutch, callous to popular censure and deaf to the voice of conscience, by averring that the hardened villain has "the grip of a snapping-turtle and the hide of an alligator." But when I first saw this famous artery—the great Aorta of North America—it was, as I have said, in a wilderness in the early part of December, when the water was at its lowest stage. It was unusually shallow upon the bars, so much so that the great steamers were not running, and the mosquitoes, snakes, turtles and alligators had all gone into winter quarters. The modern aborigines had moved away ; the white emigrants had not taken their places in that wilderness; the mighty river was flowing by the temples and ruined abodes of the primitive mound-builders, whose dust was in the graves around me, and in solitude and silence I contemplated the scene, and studied its mysteries without molestation. The sawyers had been planted by the fall and rise of the last season, and were ready for mischief. The low islands and the near and distant points of land were singular looking objects. The last three years' deposits of the river were plainly marked, and presented a great similarity of appearance on all this uninhabited part of the river. A description of it will give an idea of the greater part of the most extensive area between Memphis and Vicksburg, where the bottom is the widest, and no high land is in sight from the river. Evergreens, like the water-oak, bay, wild peach and magnolia are only found upon the alluvium which has been deposited for many years. The live-oak and Spanish moss are not found above the thirty-third degree of north latitude. They both require a warmer temperature and the breath of the south-east monsoon for their support. But on the newly formed islands and the points of the convex bends, no evergreen trees were visible. First appeared the recently made sand-bar, clean and bare, ready to receive the loam to be deposited upon it the next year. Above this rose this land made by the last rise, covered with straight switches of young willows, which had grown up since the waters commenced receding in July, and which varied in height according to their age, represented by their distance from the water's edge, from two or three inches to four or five feet. Elevated a few feet above this last formed alluvium arose that of the preceding year, supporting a dense thicket of willows and cotton-wood, twenty or thirty feet in height. Yet more elevated was a third terrance, bearing large trees, generally the same kind of cotton-wood and willows, the varieties common on all the waters of the south-western States emptying into the Gulf of Mexico, and described by Michaux and other writers on our American sylva as the *populas angulata* and *salix nigra.* Some of these poplars or cotton-wood trees, when three years old, attain a height of forty or fifty feet. The French give the name of *batture* to all the alluvium of the river three years old. The last terrace, or the fourth of this very recent formation, is the most elevated part of the bottom. Its age can only be ascertained comparatively by the superior size of the forest growth, which includes the sweet gum or *liquid amber*, and the elm, hackberry, box-elder, linden, mulberry, and, where it is oldest, all the forest trees of the southern States, except those which grow upon uplands exclusively, or poor and sandy bottoms, like those of the Pearl river of the Mississippi and the Sabine of Texas, which produce the pine, black-jack oak and other trees indicative usually of a sterile soil. But on the newly formed islands and projecting points of the part of the river I am describing, between Memphis and Vicksburg, the cotton-woods and willows, interspersed with a few sycamores, are the most prominent growth; and as they cover the new *batture* so densely as to be almost impenetrable, they grow very straight in struggling upward to enjoy the light, and their tops terminate in long narrow cones, while the old cotton-woods, more than 100 feet high, on the margins of the batture and caving banks, send out their branches laterally, while their tops assume a hemispherical or dome-like appearance. In the winter these deciduous trees lose their leaves, and the gray color of their bark and innumerable branches and twigs, unrelieved by any other hue, give these islands and points of land a very weird and wintry aspect. Their color and form have caused them to be called *tow-heads* by the boatmen. I have now given you some idea of the most striking objects of view on this part of the river—the sand-bars, *sawyers* and *tow-heads.* It is easy to see how these alluvial islands are made. The rapid current of the Mississippi, acting upon its own stratified alluvium of alternate layers of sand and clay, and undermining continually, and sweeping away the forests which grow upon its banks, shifting its channel sometimes from ten to twenty miles in less than a century, and bearing down to the Gulf by its deep and irresistible tide the entire growth of many thousands of square miles, as it shifts its deep bed from one side of its valley to the other, enables us to account for the peculiarities of its formations, some of which differ from those of all the other great rivers of the earth. None of them have so swift a current, or bear to the ocean such tributes of floating forests.* An examination of a section of its banks will show how it performs its destructive work of undermining its forests, the levees, fields and abodes of its. inhabitants. It must be remembered that its bottom current is as swift as its surface, and that the average velocity of the whole volume of the river is four miles an hour or ninety-six miles a day. The bottom current flowing against a bank washes out the sand which supports the clay. As I have mentioned, the whole then falls into the deep water. I have seen as much as five acres fall into the boiling eddies and suddenly disappear. In 1844, in the month of August, while the waters were falling, I traveled up the right bank of the river, from one point to another, twenty-five miles, opposite the cities of Grand Gulf and Rodney. In many places, by the rise of that year, the levees and roads had been cut in two and swallowed by the engulfing waves. I had often to make wide detours to avoid the cracks and crumbling ground, and to drive through the cultivated field at a safe distance from the devouring tide. While driving 100 yards from the river, which was on my *right*, I observed, twenty feet *before* me and flanking me on the left, a fresh crack, about six inches wide and very deep, extending from the river far into the field. I drove rapidly across the chasm, and had not passed it thirty yards when the entire mass, bearing more than an acre of cotton, sunk behind me and vanished with a fearful roar in the inrushing eddies. The levee, road and front yard of the large residence of the wealthy owner of the plantation had fallen, and I observed a fine old Lombardy poplar, which had been undermined, floating on the water, and hanging to a disintegrating bank by a few of its roots. A beautiful avenue of its companions had all been washed away, and it was on the eve of its departure to follow them on their voyage to the "passes," and to join the drifts of the winds and currents of the Gulf. I found the family busy moving the furniture and valuables of all kinds to some temporary house, hastily erected a mile distant from the river, and preparing to abandon their residence to its inevitable fate. A few years afterward I passed the spot, on a steamboat, and the captain of it told me that the deepest part of the river then flowed where that mansion once stood.

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* None of these rivers flow like the Mississippi, along a meridian, on from the poles toward the equator. Its course is near 110° longitude W. from Greenwich, and the centrifugal force of the earth, which elevates the ocean under the equator thirteen and a half miles above the *globe level*, and where action upon the earth's surface is from the poles toward the equator, hurls it in that direction with fearful velocity. The Nile and La Plata, nearly the same size with the Mississippi, flow from the equator toward the *poles*, and have their velocity *retarded* by the same cause.

The islands are formed by the trees which are undermined and floated away. The tops and branches of whole clusters of the largest of them, supporting masses of grasses, of grape-vines and creepers, are tied together by them, and in that tangled condition are borne off by the current. Then if their roots lodge and anchor to the bottom, their branches catch all the boulders of clay, water-logged timber, and all floating materials borne against them, and they thus form an obstruction which the water cannot undermine or remove, and it becomes the nucleus of an island. These numerous islands are rapidly formed and grow continually, but they are not permanent. They part the waters of the river, and deflect them with destructive force to the right and left against the areas covered with wild forests or cultivated fields, to sweep them away. But, by an accumulation of drifted trees, one or the other of the new channels becomes blocked up and closed by a sand-bar. This is exposed at low water, and the seeds of the willow and cotton, covered with downy wings, are sown upon it thickly by the winds, and spring up rapidly to form a young forest. This catches the wind and drift, borne by the flood of the next annual *rise*, and the land is elevated by it several feet. The island is thus attached by it to the mainland. You can easily imagine that there is nothing permanent upon the banks of this part of the Mississippi. Whoever builds upon it will find himself like the "foolish man who built his house upon the sand." It may stand the thunder gusts and northers from the Rocky Mountains, and the hurricanes and typhoons from the south-west, but there is no rock beneath his foundation to resist the descending flood which will excavate the sand and engulf his works. An artesian boring of 630 feet in depth, made in New Orleans in 1856, reached no rock. You can also understand why there is nothing beautiful, but much that is fearful, in the aspect of the river on this section of its course. It is a clear and lovely river after it receives its upper tributaries, and makes its descent over the falls of St. Anthony, and it maintains its mingled grandeur and beauty until it receives the turbid volume of the Missouri below St. Louis. This tributary is the great river, and the entire stream should be called the Missouri.* It seems to absorb the clearer and less turbulent Mississippi, and impresses its character upon it to its mouth. It descends in swift and boiling eddies, loaded with the sands of the American desert borne into it by the Platte, and discolored by the oxide of iron which paints the Yellow Stone. It obliterates the transparent beauty of the Mississippi with its muddy tide. It receives large accessions of iron paint from the ocherous waters of the Arkansas and Red river, and rolls this sand into the Gulf of Mexico and discolors its surface near its northern shore, as it is carried by the eddies of the Gulf stream from the Passes to Florida. While standing upon a precipitous bank, or the deck of a steamer, you cannot gaze upon the Mississippi, where I first saw it, without a sensation of awe. No object can be seen an inch beneath the surface of the muddy eddies, which boil up from the depths below and whirl by with noiseless but Titanian force. You cannot conjecture how far below the very spot on which you stand, the sand of strata may be undermined, and you fear that the ground may give way beneath your feet, and the treacherous waters swallow you; or if you are on one of those great passenger steamers, although you may be charmed by the beauty and conveniences of "the floating palace," propelled with volcanic power against the current, you cannot avoid thinking not only of "the safety valves" of your mighty carrier, but of the hidden snags and sawyers aimed at you from the concealed depths, and you dread the moment when one of their points may crash through the hull and sink you to the bottom. In the months of spring, when the water is colder than the air of the semi-tropical regions of its lower course, dense fogs shroud its bosom. Its current at all times of the year is generally silent, and a solemn stillness in the air is often pillowed upon its restless waters. It leaves all noisy sputtering and chiming to be made by its little children, which fall in cascades and cataracts from the Allegany, Ozark, Cumberland and Rocky Mountains. The roar of the great father of waters is only heard in the heat of summer, when he bursts the levees vainly imposed to fetter his strength, and when rivers large as the Ohio are poured through great crevasses to sweep away the habitations and plantations of whole counties. Then the roar of his waters is like that of Niagara. He roars again, like Charybdis, when he undermines these levees, and receives into his capacious jaws whole acres of solid land and all that rests upon it. The high hills of Vicksburg, Natchez, Baton Rouge and other portions of "the bluff formation," which rise above the bottom, to an elevation of from 150 to 300 feet, are very fertile, and produce abundantly tall magnolias, mingled with the large yellow poplar, or tulip tree, called "the pride of the forest of the United States." The preponderance of the beautiful evergreen Magnolia grandiflora over all the other forest growth, give these elevated points of land a very cheerful appearance in mid-winter, even where they are not crowned with cities, and with the country residences of the wealthy planters, which are usually ornamented with great taste. These bluffs have been examined and correctly described by Sir Charles Lyell, as belonging to the alluvium of the great river. He supposes the whole valley to have been upheaved, and the present bottom to have been formed since that event.

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*The Missouri bears the same relation to the Mississippi which the Madeira does to the Amazon.

It is not, I think, necessary to suppose any upheaval in order to account for the elevation of this ancient bottom called "the bluff formation," upon which the cities of Memphis, Vicksburg and Natchez are situated, and the escarpments of which are the high hills of Grand Gulf and Baton Rouge, Ellis Cliffs and Port Hudson. This river terrace contains a large area of the most fertile and beautiful uplands in the western limits of Tennessee, Mississippi and the part of Louisiana on the left bank of the river, above the Delta. Remains of it are found in other portions of Louisiana west of the Mississippi, among which are Sicily Islands and the elevated row of salt islands, in St. Marys parish, situated on Atchafalaya, Cote Blanche and Vermilion Bays. I will endeavor to account for their present elevation above the new bottom of the river, when I call your attention to the ancient river which formed the bed in which the modern Mississippi is now at work. The great fertility of the alluvial soil of this elevated terrace, upon which Vicksburg and Baton Rouge and the intervening cities are situated, in the warm climate of 31° and 32° north latitude, and aided by the moist and balmy south-east monsoon, produces a prolific growth of indigenous semi-tropical vegetation. The primeval forests which yet remain are ornamented with magnolias of immense size, whose large white flowers perfume the air in spring, and whose glossy evergreen leaves give the land in winter the appearance of summer. The principal undergrowth is the beautiful evergreen, wild peach and holly, associated with other small trees and bushes which retain their purple, crimson and scarlet fruit in the winter. The marshy lands and dry bottoms are enlivened in mid-winter by the green garments with which they are robed by the bamboo vines, palmettoes and dense cane brakes. The magnolia grows indigenously upon the older deposits of the Mississippi and its bayous, from the parallel of 32° to the borders of the Gulf of Mexico. From latitude 30° to the sea-shore it is associated with the lovely live-oak (*quercus virents*), groves of which, growing spontaneously, or planted in avenues or clusters, form attractive objects in the scenery of the banks of the lower Mississippi. After receiving the waters of Red river, the last of its great tributaries, its vast volume loses nothing of its velocity, but the landscapes about it are improved in appearance by the numerous improvements of the planters. The forests are well cleared from the margins of the river, which are elevated high above the swamps on either side, which appear from a half mile to two miles distant covered by a dense forest of cypress, tupelo, gum, and a variety of other

Note.—The term "upper coast" is applied to the banks of the river between New Orleans and Baton Rouge, and the country bordering it from New Orleans to its mouth is called "the lower coast."

trees which grow in the water. But the tall cypresses give an impressive character to the scenery. Their trunks are straight and without branches to a great height. Their limbs are sent out laterally from near the top of the tree, and the crests of these cypress forests are not serrated with domes, cones and pinnacles, or indented in their outlines like those of other trees, but they form a horizontal plane parallel with the surface of the swamps on which they grow. They are festooned with the Spanish moss. In the winter, when stripped of their foliage and draped with the pendent masses of this gray moss, they present a dismal, funereal aspect to the stranger, who cannot look upon them without thinking of disease and death, and of all that is suggested to the mind by "the sable drapery of the tomb." But such gloomy reflections are dispelled by the objects which attract the sight upon the cleared and cultivated shores as we approach the great city of New Orleans. The mansions of the planters are often constructed with a regard not only to comfort and convenience, but display some architectural taste. They are generally built in the French or Spanish style, with one or two stories pillowed, verandah surrounding them, to admit the sea breeze and exclude the heat of the sun, and they are embowered amid live-oaks, magnolias, cedars and exotic evergreens, well cultivated gardens, which produce most of the vegetables of the temperate zones in the winter as well as in the summer, and orchards of Japan plums, oranges and other varieties of citric fruits, as well as grapes, peaches, pears and plums. The soil is fertile beyond conception. Its capacity for the production of varieties of fruits, vegetables and ornamental plants has never been fully tested. The rich alluvium cultivated is devoted chiefly to making sugar, and the large establishments of the planters, with their residences, great sugar mills, refineries, and their necessary appurtenances of shops, stables, warehouses, and the quarters of the numerous laborers arranged in streets and squares, give these spots continually at first sight the appearance of towns and villages. Here the river is enlivened by the continual passing of steamers and every variety of flat-boats and barges, interchanging the productions of the great valley with those of all maritime and commercial nations. Below New Orleans the scenery presented by the shores of the river is greatly improved, and much of it is tropical in its character. This part of the delta, called the *lower coast*, has been very recently formed by the deposits of the river upon the ancient delta and the bed of the Gulf of Mexico, the shore of which once extended far above New Orleans. It is a narrow strip of land, separating the waters of the Gulf of Mexico, which now approach it under the names of Lake Borgne and Barratieria Bay, and various other bodies of water. It is 110 miles from New Orleans to the mouth of the river, the surface of which at the city is elevated at high water about fifteen feet, and at low water only five feet above the sea level. Numerous bayous connect it with the lakes and bays projected from the Gulf. With the exception of a few low ridges of land upon these bayous, the only portions of the whole area sufficiently elevated for the cultivation of cotton, sugar, corn, vegetables and fruits lie upon the banks. At variable distances, from a half mile to a mile and a half, marshes, covered with cypress forests, or high trees and palmettoes, or tall grass, flags, mangroves and myrtles, separate the cultivated fields from the water of the ocean. As the river projects into the Gulf, the land narrows until it terminates in low, marshy points, covered with reeds and rank water grass and marshes. The forest trees which grow upon dry land, and also the cypress trees and others which occupy the swamps, gradually disappear, until there is nothing to obstruct the view of the water of the Gulf and its bays. The whole of this narrow projection of the delta which borders the river is densely populated and highly cultivated by a greater variety of races of men than can be found anywhere else on this continent who are not congregated in cities. The large sugar plantations, occupying sometimes several miles of the river banks, are owned by wealthy natives of England, Scotland, France, and of all the older southern and northern States, or by creoles, born upon the lands which they inherited from their French or Spanish ancestors. The residences of the wealthy planters are often beautifully ornamented. Their yards are shaded with large pecan trees, live-oaks, and other varieties of native growth, mingled with others imported. Hedges of evergreen roses, and sometimes of the sour osage, whose beautiful golden fruit hangs upon the tree all the winter, and the Japan plum, which never withers, and prolific and delicious clusters ripen in February and March, with the orchards of sweet oranges and lemons of every variety, and the broad-leafed bananas, give these abodes a very tropical aspect. The houses of many of the descendants of the original emigrants from Spain, France and Italy are built in some places, for miles, close to each other, and a continuous orchard of orange trees, many of them thirty feet high, and forty or fifty years old, partially conceals these primitive abodes from the only public roads they have, and which run with the protecting levees and telegraphic wires directly upon the banks of the river. Some of them are thatched with the leaves of the palmetto, and have growing about them citrons, shaddocks, bananas and fig trees, and there is little about the habitations, or the swarthy skinned inhabitants, different from the aspects of human life in many places of the torrid zone. They are engaged in fishing and hunting, and raising rice and oranges for the New Orleans market. The surface of the river is higher than their abodes and fields ; and you can look down upon them, and over all the flat country, from the deck of a steamboat. The equatorial current, which flows against all this lower coast, having a temperature of upward of 70°, warms it in winter; while the temperature of the water of the river never falls below 50° in the coldest weather. The moisture and richness of the soil, aided by this mild temperature, makes this last formed part of the earth the most productive. In some years, when the seasons are favorable, as much as three hogsheads of sugar, or 3,600 pounds, are made to the acre, which is a product equal to $360. I have known 2,200 pounds of rice made upon an acre of this land, and a single hand can cultivate ten acres. As much as $7,000 have been made by the sale of the oranges from an acre and a half. The monsoon prevents the heat from being oppressive, and the river aids in cooling the atmosphere in the summer. It retains much of the coldness it brings with it from its mountain sources. The only cold weather felt in Louisiana, Texas and Mississippi comes from the north-west, and is caused by what are called "the northers." They do not blow from the north upon these States, but they descend from the north-west, and are produced by the condensation of the air on the snow-covered range of the Rocky Mountains, extending from New Mexico to Alaska. They blow very regularly for three days and nights in succession, whenever they occur between the first of November and the last of March, and are the most intensely cold in mid-winter, when they sometimes, in New Orleans, reduce the temperature to 15° above zero. There is no regularity in their occurrence. Some winters pass away with only one or two, giving the Gulf States only two or six days of freezing weather. I have known only one winter in the last thirty years to elapse without any. Other years were visited by three, six and nine of these Rocky Mountain blasts, making nine, eighteen and twenty-seven cold days, which was the largest number in the same period. In some respects they are positive advantages. They give these southern States all the weather sufficiently cold to enable the planters to salt and pack their meat. When they come early in October or late in April their effects are very disastrous. They wither all vegetation and destroy the crops. They combine with the south-east monsoon to form the terrific typhoons which sweep the Gulf of Mexico and its shores, and the Atlantic Ocean along the track of the Gulf stream. When these northers blow upon the delta they wither the cane, orange flowers and all tender plants upon the lower coast, not protected by the river. I have mentioned that its water in the winter is comparatively warm; and I have never found it lower than 50° or 60°, below New Orleans. The air in contact with it is reduced or elevated to the temperature. What may be termed the warm "breath of the river" is borne to the south-east by the north-west wind, and gives the plantations, orchards and gardens on both banks, which are situated to the south-east of the river, or to the *leeward* of the norther, a frostless climate. Not a leaf or flower is blighted, and the verdure of spring is perpetual in all these sheltered curves of the river, as it pursues its rapid course on its serpentine path from New Orleans to "the Passes."

The most of this grand and beautiful region, made by the most recent deposits of it, is included in the parish of Plaquemines. On account of its great fertility, and the enormous crops of sugar, rice, cotton and tropical fruit, and the abundance of vegetables, fish, poultry, game and wild fowl, as well as the domestic animals it produces, it is called "the empire parish" of Louisiana. It would be the most desirable of human abodes, but for a number of evils which infest it, and which are sufficient to unparadise any earthly Eden. The hurricanes and cyclones, the malaria, the mosquitoes, deer flies and sand gnats, successively or acting in concert, are perpetual annoyances and often fearful calamities. You have doubtless read many descriptions of the whirling storms which occur most frequently in those parts of the globe where the equatorial currents of the ocean are found. They are most prevalent in the Pacific, where the great *kuro siwo* or black current flows from the equator and bears its heated waters toward the north-western shores of America, along the eastern coasts of the islands of Japan ; and in the Caribbean Sea, the Gulf of Mexico and the Atlantic, where they follow the course of the Gulf stream. They are also very destructive in Madagascar and the islands of Bourbon and Mauritius, in the track of the Mozambique current of the Indian Ocean. Light winds in Texas, Louisiana and Mississippi veer occasionally from between all the cardinal points, but the prevailing wind, in summer and winter, is a south-easterly monsoon, which comes loaded with moisture from the tropical waters of the Atlantic, Caribbean and Mexican gulf, and deposits nearly all the snow which falls upon the Rocky Mountains. In Texas this sea-breeze blows strongly day and night continually, the year round, only interrupted a few days in each of the four seasons. Whenever this balmy and delightful breeze blows for a time with more than usual force, it deposits an unusual amount of snow upon the Rocky Mountains, which causes a great condensation of the air about its crests. In winter this condensed air, or some ærial obstruction, stops the course of the monsoon, which is succeeded by a calm. The sun, acting upon the semi-tropical plains of this region, rarefies the atmosphere. The barometer falls. The air is thin. A suffocating calm is prognostic and precursor of the norther. The condensed Rocky Mountain air-bank expands, and with clouds, lightning, hail and rain, or in a clear and cutting cold blast, it pours down suddenly from the north-west to fill the vacuum, or to restore the equilibrium of the atmosphere. It presses back the monsoon which meets it from the south-east. A terrible struggle of the winds ensues; not as you have probably read between the south-eastern and north-eastern trade-winds; for, on all the Texan coast, during observations made for more than thirty years, I have found no *north-east* trade-wind but between the south-east gale and the norther. A typhoon is the result of the encounter, and these destructive storms, when they are thus produced on the Gulf, whirl away toward the north-east, following the lines of least resistance, *the thin and warm air-paths*, made by the Gulf stream, or lying in its direction from south-west to north-east across the Gulf States. The great typhoons, and the lesser whirlwinds, commence at different points on the mainland, and far out at sea, generally somewhere between the island of Cuba and the peninsula of Yucatan and the Rocky Mountains; but, whether they are 500 miles in diameter, or only a few yards, their centers all move from the points where they occur toward the north-east. When the terrible cyclone occurred on the 19th of September, 1854, which destroyed entirely the city of Matagorda, and visited with destruction much of the eastern coast of Texas, and the shipping on the Gulf, I was in the interior of Texas, sixty miles from Austin and about 220 miles due north-west from Matagorda. A furious norther suddenly descended from the direction of Pike's, Long's and the Spanish peaks and blew down my tent, and for three days and nights, including the equinox, made us all very uncomfortable. A large party of old Texan frontier people were encamped at the Lampasas Springs, then in a wilderness. We were enjoying the pleasures of buffalo and antelope hunting, and using the sulphur water, disputing its possession with the Comanches. If you will examine the map, you will find that a line drawn from the south-east to the north-west, and which marks precisely the track of the opposite winds, will touch Matagorda and the Lampasas Spring, and penetrate the loftiest snow-covered chain of the Rocky Mountains, crowned by the gigantic peaks I have mentioned. There was no whirling, raging wind where I was, but three days and nights it swept fiercely on a straight line from Long's peak to Matagorda, where it made a vortex with the monsoon; and for the same time precisely, but commencing and ending a few hours later, it *whirled* everything to ruin, as it moved to the north-east. Many observations like this, continued for the quarter of a century, have convinced me that the northers of Texas always aid in forming the typhoons of the Gulf of Mexico, and that all the whirlwinds of the south-western and Gulf States are produced by the winds from the Rocky Mountains and the south-east monsoon, which meet each other on the same air-lines, whose general direction is south-east and north-west, and the tornadoes they produce move from south-west to north-east.

But, no matter what may be their cause, they are the most terrible scourges of the lower coast of the Mississippi. The narrow point of land which forms its trough, 110 miles from New Orleans to the Gulf, lies directly in their track, and at intervals of ten or twelve years they sweep over it with destructive force, and inflict damages upon the inhabitants which it requires many years of industry and economy to repair. A description of one of these great storms, which occurred the 10th of August, 1860, as it was observed at one point, sixty miles below New Orleans, will give you a general idea of them all. The levees broken, the plantations injured by being inundated by the salt water of the sea, houses and fences destroyed, orchards blown down and washed away or killed by the salt water, horses, cattle, sheep, hogs and poultry drowned, and individuals and whole families engulfed by the mingled waters of the Mississippi and the Gulf, make some of the items of the last of these terrible visitations of which the inhabitants speak with dread, and from the effects of which many are now suffering.

Elmwood is situated, like all the other residences of the lower coast, upon a higher part of the alluvium, with space between the house and river for a shaded yard, a road, and an embankment to protect it from the high water. A fine orange orchard and garden, a large barn, stables, quarters for the hands, sixty head of cattle, a large flock of sheep, a fine herd of hogs and an abundance of poultry, and the appurtenances of a well-managed and thrifty rice farm belonged to the owner. The vortex of the storm slowly approached it from the south-west, and wind, rain and terrible lightning with mingled might, for three days and nights, beat upon it. The wind, whirling from right to left, or from the south by the east to the north, forced the waters of the Gulf into Lakes Pontchartrain, Borgne, and all the bays and inlets, and blew the surface of the Mississippi a mile wide up stream. The ocean water soon encroached upon the marsh between the Gulf and the plantation, and gradually rose against what is called "the back levee," constructed to protect it against the stormy waves of the sea. At length, the great breakers rolled over it and swept it away. The billows flowed over the plantation, floating off the fences and all the domestic animals of every kind. The angry waters, covered with drift-wood, upon which the wild beasts and reptiles of the swamps had taken refuge, rushed into the yard and roared against the dwelling. Trees and floating wrecks of out-houses mingled with the struggling horses and domestic animals, vainly battling with the storm for their lives, added to the horrors of the scene. The water rose and pressed against the lower floors of the houses. To prevent them from floating away with their families, some of the planters cut large holes through the flooring and opened the lower doors and windows to admit the wave and add their weight to prevent them from being lifted from their foundations. The wild-cats, raccoons, and, in some instances, panthers and dangerous reptiles, forsook the floating drift-wood and took refuge in the houses that withstood the tempest. One gentleman, in the neighborhood of Elmwood, killed three rattlesnakes that crawled into his porch. More snakes are found in this region than in any other part of the United States; and every variety of reptile in the whole valley of the Mississippi is abundantly represented here. They hibernate in hollow logs and take refuge upon them in the spring, when the bottoms of the tributaries of it are inundated, and they are floated down to the delta where all this wreck of the forests is stranded by the winds and waves upon the banks of its lower coast and on the Gulf shores about its mouths. The snakes are thus landed in this region, where, with the alligators and other species of animals without number, they multiply incredibly, and change into new varieties. The family of Mr. Cannon, at Elmwood, about thirty persons including his slaves, took refuge in the upper story of his house when the lower was submerged. Heavy logs were driven by the waves, with the force of battering-rams, against the barn, stables and outhouses, all of which were knocked down and floated away, with the fences and with every animal upon the place. A row of large fig trees, which stood between the house and ocean current, remained firmly rooted, and with their thick and strong branches caught the advancing trunks and heavy drift, and prevented them from being hurled against the dwelling, which was the last house left standing. Boats and sailing vessels were useless. No ship could withstand the storm; and some of the families who attempted to escape by that mode were wrecked and drowned, and others disappeared in the tempest and were never heard of again. The water of the river and of the Gulf rose together. At length the great breakers from the Gulf rolled over the front levee and mingled with the river; and the land was entirely buried by the stormy waters, which rolled like the uncontrolled ocean remote from any shore. On the third day of this remarkable typhoon the solitary house containing the family at Elmwood rocked and swayed to the shock of the winds and waves; and when the last whirl of the tempest struck it with a sweep from the north-west, it seemed for a few moments that their final mortal hour had come; but the house remained upon its pillars, and the waters were driven out, by the change of the blast from the north and west, as rapidly as they had been gathered by its wings when they swept from the south and east. In a few hours the dreadful meteor passed away to the north-east, with all its majesty and awful grandeur, while a radiant rainbow glittered upon the banners of its retreating cohorts of thundering clouds. The trembling family were left alive upon the land, stripped bare of all their property, except the little gathered in a single house, but thankful to the God who had spared them that, with their lives.

I consider these storms, which occur at irregular intervals, as the worst of the ills with which the lower coast is visited. But the soil is so fertile that the planters recuperate from their effects, and many of them become and remain wealthy in spite of them. A mass of logs and vegetable matter, at least 300 feet thick, forms the skeleton of the land; and they bear as large a proportion to the whole bulk of the alluvium as the bones of the human body do to the flesh. The soil contains every chemical ingredient and fertilizing agent that can be found, separately or combined, in all the valleys of its tributaries which bring their contributions from the Ozark, Cumberland, Allegany and Rocky Mountains, and from all the rich cretaceous, magnesian and silicious prairies and wooded regions they irrigate. Red river and the Arkansas flow through a gypsum field east and north of the great staked plain of Texas. This has not been fully explored, but it was traced by Prof. Shumard 300 miles, and was found to be seventy miles wide at its narrowest part, and the layers of gypsum were everywhere fifteen feet thick. This gives the bottoms of the Colorado, Brazos, Red and Arkansas rivers, their marvelous fertility; and the last two streams discharge it abundantly into the Mississippi, to be mingled with the carbonates and phosphates of lime and the charcoal of the burnt prairies brought down by those rivers, and the Kansas, Tennessee and Cumberland, and all the great and small affluents of the Missouri, upper Mississippi and Ohio. Its fertile alluvium is its mud and all the solid matter rolled down with its water-logged timber upon its bottom and heaped into batture by its eddies. The water itself is absolutely pure and holds little or nothing in solution. A chemical analysis of it, made for the Academy of Sciences, in New Orleans, by Dr. Riddell, proved that when clarified of its mud it is pure as rain-water just fallen from a winter cloud, or that of the coldest spring formed from melted snow. The sulphates of iron and lime, and the carbonates and mineral ingredients of every kind poured into it by a thousand streams, seem to have neutralized each other and fallen to its bottom to enrich its soil, and left the water unalloyed. Of all the filth poured into it from the butchers' stalls and sewers of New Orleans, I do not think a particle could be found in its current a mile below the city. The alligators, alligator-gars, catfish, turtles, shrimps, and voracious fish and reptiles of all sizes, and more than a hundred varieties, devour it all; or it sinks to the bottom and combines with its mud. I prefer it to any other water for drinking. It is said of travelers who have tasted the water of the Nile, that no matter in what regions they may live, they always thirst for it. It is so with those who have become accustomed to drinking the Mississippi. I have often walked a mile through New Orleans, in a sultry summer day, to enjoy an iced draught of it from the *coolers* of the steamboats lying at their landings on "the levee." There is no danger in the delta to be apprehended from earthquakes or famines. Whenever there is an earthquake at New Madrid in Missouri, there is a simultaneous shock at Caraccas in South America, and Sir Charles Lyell thinks that these points are connected by a *lava sea*, which must underlie the delta of Louisiana. But the subterranean wave of fire does not disturb it, and there is no evidence that the lower coast has ever felt the tremor of an earthquake. This proves that the crust of the earth beneath this semifluid and almost amphibious region is very thick and stable. Every bayou teems with fish and wild fowl. The bays are bedded with oysters. The flat prairies and marshes abound in deer and all the varieties of game found in the Gulf States, besides herds of wild cattle and hogs. The Malays and Chinese, and the mixed population engaged in the business of fishing and fowling, make fortunes at it. The river surface is elevated, in the spring and summer, far above their fields. This renders them independent of rain. When they need water, they have only to open their ditches, and close the gates of their back levees, and let all the river flood their fields. After they have covered them with water and saturated them sufficiently, they close their front water gates and open those next to the swamps, and the water runs off and leaves them dry. In speaking of the evils they suffer from typhoons and whirlwinds, I ought, perhaps, to have mentioned the lightning which falls from the small summer clouds with the ordinary showers; and which, in this flat country, is very dangerous. Where there are few elevated objects, it falls upon the telegraphic poles, upon trees, and houses unprotected by Franklin-rods, and is even attracted by the pointed reeds, which are twelve or fifteen feet high, and cover hundreds of square miles of the uncultivated parts of the delta. In the fall, spring and winter the lightnings keep these reed brakes burning continually. I saw six fires kindled in different parts of these prairies within an area of six square miles by the lightnings of a single small thunder cloud, which passed over it in a half hour. They usually continue burning until their course is arrested by the natural bayous or artificial canals, which intersect the lower coast in all directions and render these fierce fires harmless. They are beautiful objects at night, and illuminate every part of the horizon during the winter with the splendors of many auroras.

Next to the typhoons, the malaria is the most dangerous evil of the delta. Every form of fever prevails in it. Yet thousands are born and live among these swamps and marshes to extreme old age. The wealthy and educated classes of the planters are generally healthy and long-lived, and the youths of both sexes are remarkable for their strength, activity, intelligence and beauty. Refinement, hospitality, politeness and elegance of manners are almost universal among the creole landholders of various nationalities. It is a remarkable fact, that during two years while I had charge of this whole area of one hundred and ten miles as the only protestant minister in it, and visited every part of it at all seasons of the year, exposed to wettings, to heat and cold, night and day, I was not confined by sickness a single day ; and although I baptized about fifty persons in Plaquemines parish and other parts of Louisiana, I only buried one. There was some sickness at all seasons, and several deaths from yellow fever ; but I happened not to be called upon to perform the funeral service. Usually, where I have baptized fifty, in what are regarded the healthiest parts of our country, I have buried from five to ten. This proves that, notwithstanding the malaria which infests it, the region is not very unhealthy. The greatest annoyance it suffers is from the blood-sucking insects of various kinds. There are no bed-bugs or chinches in the delta, and I have never seen the black chigger of the West Indies and Florida ; but the small red variety is abundant. There are many varieties of mosquitoes, but three of them are almost intolerable pests. The gray variety, which is found upon every spot of the American continent where there are marshes which generate malaria, and which annoyed Captain Franklin even at the mouth of McKenzie river on the shore of the Arctic Ocean, appears in mid-winter on the lower coast, and is always vigorous and voracious, except when the thermometer in a bedroom is at the freezing point. But they love night and darkness, and are not very troublesome in the day; and they avoid the heat of the sun. A smaller gray kind is awake, active and blood-thirsty all day, and make reading and writing impossible without the protection of netting. They have the recommendation of biting without singing. But the worst of all the tribe is a short-winged, yellowish variety, which is averse to shade and avoids the interior of houses, and makes its attacks in the hot sunshine and the strong sea-breeze. They alight upon the clothing or naked skin, and cling fast and fearlessly to whatever they catch. They cannot be frightened by a wave of the hand or any threat. To get rid of them you have to *mash* them. Their long bills are slightly curved *outward*, like a sabre, and they deliberately adjust their points, throw the weight of their bodies upon them, pulling with their fore-feet and *spade* them into the skin, which they reach through thick woolen clothing. At some seasons of the year the plowmen are compelled to work with thick gloves upon their hands and veils over their faces, and to cover their mules with a blanket of corn sacks sewed together. The villainous gray mosquito infests portions of the whole continent, and they seem to be as well adapted to endure the severities of various climates as man himself. An insect which can thrive amid the arctic snows at the mouth of the McKenzie, and which feasts with equal delight upon the naked negro and fur-clad Esquimaux, must have a fine appetite and a strong constitution. Even here each one of you is familiar with the ear-piercing shriek of joy uttered by the voracious little pest when *she* smells the blood of an American—I say *she*, for the males never bite. It is difficult to ascertain what work these insects perform in the economy of nature in our world, where good and evil are mixed like tares and wheat in a common field. They are certainly not an unmixed evil. They do not feed exclusively upon *blood*, although they like it. They are as fond of sugar as children. I have seen them so thickly clustered upon a lump of it that they made it look as if it was covered with mould. They also feed upon some matter they find in the mud along the margins of stagnant and putrescent ponds and bayous. I have found them near this fœtid water with their bills stuck in the disgusting muck, filling themselves with something, which I hope was *malaria*. If malaria is a plant of the *fungus* or *algæ* family, like the *mushroom* or *yeast*, which propagates its species by little *spores*, which fly in the air or float in water like dust, and plant themselves in the human lungs or stomach, and by growing in the blood, feeding upon its *carbon* and acidifying it with *oxygen*, produce fevers and other diseases, as physicians suppose; if the *mosquitoes* eat these destructive little plants and prevent them from killing us, then they are to some extent benefactors, and they are welcome to a little of my blood, if it kills them.

It would require a separate and elaborate lecture on *entomology* to describe the deer-flies, sand-flies, and other *sanguinivorous* insects of the lower coast, which deserve the penalty imposed by the sacred law: "Whosoever sheddeth man's blood, by man shall his blood be shed." The common spotted-winged, yellow horse-fly, which in all the older States confines its attack mostly to the ears and other parts of horses, is called the *deer-fly*. They swarm in countless multitudes, and assail men as well as beasts in the sunshine and wind. They avoid the interior of houses. The little sand-flies are pigmy mosquitoes, which are the peculiar pests of the lower coast, and especially of the passes in mid-winter. They are peculiarly offensive in the night-time, when they penetrate the ordinary mosquito bar and render sleeping impossible. A netting of finer material, with smaller interstices, is required for protection against these pigmies, whose multitude supplies their want of magnitude.

With this brief notice I will dismiss the whole subject of these buzzing swarms of *she cannibals*, the remembrance of which is very painful to me. I will call your attention to only one more of the animals of this region, and I select it for description from hundreds of its genus, because it reflects some light upon our religion and ancient myths. It is a sting-snake—*a veritable Apollyon, with a sting in its tail.* I have seen two varieties of them, neither of which resemble the jointed snake, a kind of *saurophidian*, or connecting link between the lizard and the snake. There are many varieties of this harmless reptile, each of which has the end of the tail armed with a pointed, horny cartilage. But the two varieties of the sting-snake which I have seen are large and dangerous reptiles, armed with real stings which they thrust out from their sheaths or withdraw, and with which they strike, like the hornet or wasp. They have been found in Pontotoc and Coahuma counties, Mississippi, and in Travis county, Texas. I had two of them in my possession in Austin in 1852. They have also been found in St. Mary's parish, Louisiana, and they are numerous on the banks of the lower Mississippi, in Plaquemines parish. One variety is a shining brown-black reptile, about five feet in length and five inches in circumference when fully grown, with a small head and large neck. Underneath, the body is marked like a *backgammon* board, or *tesselated pavement*, with alternate squares of reddish-yellow and black. While crawling or lying basking undisturbed, the tail looks like that of most other snakes—long and tapering, but slightly blunted at the point; but when it is irritated, it thrusts out a keen black sting two and one-half inches in length, with which it strikes instantly, like the *sting-ray*, with great accuracy and force. The sting is sheathed like that of a bee, but it is not barbed, as the ancient artists painted the tails of the dragon and "the old serpent.' But the serpentine monsters of Grecian myths, with appendages of stings to their tails, proves that serpents of this kind must have formerly existed in the Old World, as they certainly do now in the New. Another variety was discovered by Judge McGilhenny, upon Avery Island, in St. Mary parish, and was sent by him to the Academy of Sciences, of New Orleans. He found, also, specimens of the black kind, which are of golden-yellow color, banded with jet black splotches, which give it a hideous appearance. But few can look upon this formidable reptile, five feet long and six inches in circumference, armed with a sting two and one-half inches long, strong and keen as a tailor's needle, without a shuddering sensation of antipathy and dread. I described these snakes to Prof. Agassiz in October, 1868, and he told me that he had never heard of them except in the popular legends of the ignorant about *hoop-snakes*, which are based upon the real existence of these reptiles. They are certainly capable of inflicting a mortal wound upon man or beast; yet I have never known a single individual killed or wounded by one; and it is remarkable that, during a life of more than thirty-four years in Mississippi, Louisana and Texas, where so many venomous reptiles abound, I have the positive evidence of only one person who has died during that long period from the sting or bite of a serpent in either of those States. He was an old gentleman by the name of Duty. He died in fifteen minutes after he was bitten by a rattlesnake, near Austin, about twenty years ago. This proves that the dangers of this region, threatened by such venomous reptiles, are much exaggerated. More persons die from the bites of mad dogs in our large eastern cities than are killed by all the reptiles and wild beasts of the vallev of the Mississippi.